CLAIMS:

1. An integrated circuit capable of detecting two or more different target biomolecules, said circuit comprising:

(a) a plurality of sources of electromagnetic radiation;

(b) a first detector capable of detecting a first distinct electromagnetic signal;

(c) a second detector capable of detecting a second distinct electromagnetic signal;

(d) a first sensing element operably associated with said integrated circuit wherein said first sensing element selectively detects a first target molecule;

(e) a second sensing element operably associated with said integrated circuit wherein said second sensing element selectively detects a second target molecule; and

(f) means for generating an output signal related to the detection signal obtained from each of said first and said second detectors.

2. The integrated circuit of claim 1, wherein the said first and said second sensing elements each comprise a plurality of bioprobes secured to a solid support.

3. The integrated circuit of claim 2, wherein at least one of said bioprobes is operable to specifically bind to a target biomolecule or a target biological species.

4. The integrated circuit of claim 3, wherein said target biological species is a bacterium, a fungus, a virus, or an eukaryotic microorganism.

5. The integrated circuit of claim 3, wherein said target biomolecule is a polynucleotide, a polypeptide, or a peptide.

6. The integrated circuit of claim 2, wherein said solid support comprises a substrate, a filter, or a membrane connected intermediate between said plurality of probes and at least one of said sensors.

7. The integrated circuit of claim 2, wherein said solid support is operable to filter said electromagnetic radiation.

8. The integrated circuit of claim 2, wherein said solid support further comprises an optical filter or a lens.

9. The integrated circuit of claim 1, wherein said first or said second sensing element comprises a molecular probe, a biomimetic, an antibody, an enzyme, a cell receptor, or an intact biological cell.

10. The integrated circuit of claim 9, wherein said molecular probe comprises a chemical receptor, a bioreporter, or a biopolymer.

11. The integrated circuit of claim 9, wherein said biomimetic comprises a molecular imprint or a biomimetic probe.

12. The integrated circuit of claim 1, wherein the sources of electromagnetic radiation comprise a light emitting diode, a diode array, a laser, or a laser array.

13. The integrated circuit of claim 1, wherein said first or said second detector is a photodetector.

14. The integrated circuit of claim 13, wherein said photodetector is a photodiode, an avalanche photodiode, or a phototransistor.

15. The integrated circuit of claim 1, further comprising a signal amplification system or a signal processing system.

16. The integrated circuit of claim 15, wherein said signal amplification system or said signal processing system further comprises a microprocessor or an amplifier.

17. The integrated circuit of claim 1, wherein said electromagnetic signal is detectable in the infrared, near-infrared, far-infrared, visible, ultraviolet, near-ultraviolet, far-ultraviolet, microwave, or x-radiation frequency range.

18. The integrated circuit of claim 1, wherein said first or said second detector further comprises a transimpedence amplifier or low-pass filter.

19. The integrated circuit of claim 1, wherein said plurality of probes are tagged with a label that responds to said electromagnetic radiation from said sources by emitting or absorbing distinct electromagnetic responses, each response having a different frequency.

20. The integrated circuit of claim 19, wherein said electromagnetic responses are selected from the group consisting of luminescence scattering, infrared absorption and ultraviolet absorption.

21. The integrated circuit of claim 1, wherein said probes respond to said electromagnetic radiation by emitting a luminous signal.

22. The integrated circuit of claim 21, wherein said luminous signal is in the visible or near-infrared region or the spectrum.

23. The integrated circuit of claim 9, wherein said enzyme cleaves a chromogenic substrate.

24. The integrated circuit of claim 3, wherein said enzyme is green fluorescent protein, β-galactosidase, catechol-2,3-dioxygenase, or alkaline phosphatase.

25. The integrated circuit of claim 5, wherein said polynucleotide comprises DNA, PNA, or RNA.

26. The integrated circuit of claim 1, wherein said sources of electromagnetic radiation comprise an X-ray, a microwave, a light emitting diode, a laser, visible light, ultraviolet light, infrared light, near-infrared or near-ultraviolet light.

27. The integrated circuit of claim 1, wherein the detection circuitry further comprises an amplifier, for amplifying the at least one detection signal.

28. The integrated circuit of claim 36, wherein at least one of said sensing elements comprises a two-dimensional array of probes.

29. The integrated circuit of claim 28, wherein at least one of said sensing elements comprises a two-dimensional array of optical detector-amplifiers corresponding to said two-dimensional array of probes.

30. The integrated circuit of claim 29, wherein the optical detector-amplifiers are integrated on a single circuit.

31. The integrated circuit of claim 1, wherein the plurality of sensors comprises an array of *n*-well amplifier-photodiodes.

32. The integrated circuit of claim 1, wherein the plurality of sensors comprises a 2×2, a 4×4, a 6×6, an 8×8, or a 10×10 array of sensors.

33. The integrated circuit of claim 1, wherein said plurality of probes comprises a 2×2, a 4×4, a 6×6, an 8×8, or a 10×10 array of probes.

34. The integrated circuit of claim 31, wherein the *n*-well amplifier-photodiodes are integrated on a single IC chip.

35. The integrated circuit of claim 2, wherein said solid support further comprises an optical filter.

36. An apparatus comprising the integrated circuit of claim 1.

37. A detection system that comprises the integrated circuit of claim 1 or the apparatus of claim 36.

38. A detection kit comprising the integrated circuit of claim 1, and instructions for using said integrated circuit.

39. Use of the integrated circuit of claim 1, in the manufacture of a device for detecting a plurality of biomolecules in a test sample.

40. A method of detecting a plurality of biomolecules in a sample, said method comprising the steps of contacting a sample suspected of containing a plurality of biomolecules with the integrated circuit of claim 1; and detecting the presence of an output signal from two or more of said sensors, wherein the presence of said output signal is indicative of the presence of said biomolecules in said sample.

41. A method for detecting a plurality of different pathogens in a sample, comprising contacting a sample suspected of containing two or more different pathogens with the integrated circuit of claim 1, wherein one or more of said probes is specific for each of said pathogens, and wherein generation of said output signal from each of said probes is indicative of the presence of each of said pathogens in said sample.